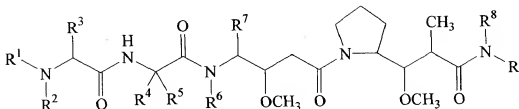


# CLAIMS

1. A compound of the formula



wherein, independently at each location:

R<sup>1</sup> is selected from hydrogen and lower alkyl;

R<sup>2</sup> is selected from hydrogen and lower alkyl;

R<sup>3</sup> is lower alkyl;

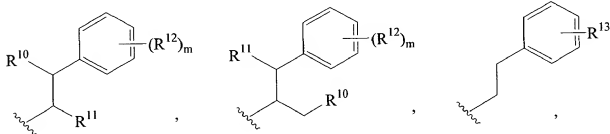
R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>3-7</sub>carbocycle when R<sup>5</sup> is selected from H and methyl, or R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6;

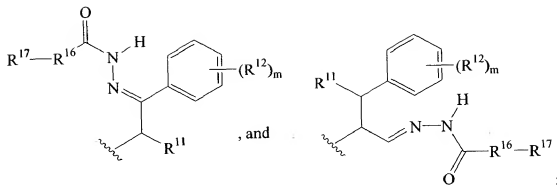
R<sup>6</sup> is selected from hydrogen and lower alkyl;

R<sup>7</sup> is *sec*-butyl or *iso*-butyl;

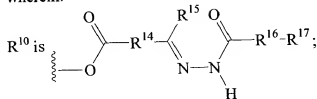
R<sup>8</sup> is selected from hydrogen and lower alkyl; and

R<sup>9</sup> is selected from





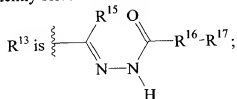
wherein:



$R^{11}$  is selected from hydrogen and lower alkyl;

$R^{12}$  is selected from lower alkyl, halogen, and methoxy, and  $m$  is 0-5

where  $R^{12}$  is independently selected at each occurrence; and



wherein:

$R^{14}$  is selected from a direct bond, divalent lower alkyl and

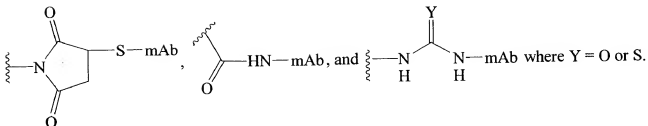
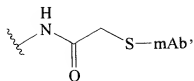
divalent aryl;

$R^{15}$  is selected from hydrogen, lower alkyl and aryl;

$R^{16}$  is selected from divalent lower alkyl, divalent aryl, and

$-(CH_2OCH_2)_pCH_2-$  where  $p$  is 1-5; and

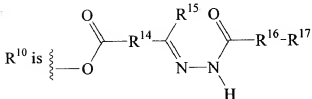
$R^{17}$  is selected from



2. A compound of claim 1 wherein  $R^1$  is hydrogen.
3. A compound of claim 1 wherein  $R^1$  and  $R^2$  are methyl.
4. A compound of claim 1 wherein  $R^3$  is isopropyl.
5. A compound of claim 1 wherein  $R^4$  is selected from lower alkyl, aryl, and  $-\text{CH}_2\text{-C}_{5-7}\text{-carbocycle}$  and  $R^5$  is selected from H and methyl.
6. A compound of claim 1 wherein  $R^4$  is selected from lower alkyl, and  $R^5$  is selected from H and methyl.
7. A compound of claim 1 wherein  $R^4$  and  $R^5$  together form a carbocycle of the partial formula  $-(\text{CR}^a\text{R}^b)_n-$  wherein  $R^a$  and  $R^b$  are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6.
8. A compound of claim 1 wherein  $R^6$  is lower alkyl.
9. A compound of claim 1 wherein  $R^8$  is hydrogen.

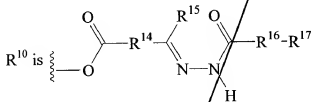
Q

- R10C(C(R11)\*)C1=CC=C(C=C1)R12m



11. A compound of claim 10 wherein R<sup>14</sup> is selected from divalent aryl and divalent alkyl; R<sup>15</sup> is selected from lower alkyl and aryl; and R<sup>16</sup> is divalent lower alkyl.

- 
- Chemical structure of a substituted cyclohexane ring. The ring is fused to a benzene ring. The cyclohexane ring has substituents  $R^{11}$ ,  $R^{10}$ , and a wavy line. The benzene ring has a substituent  $(R^{12})_m$ .

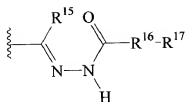


13. A compound of claim 12 wherein R<sup>14</sup> is selected from divalent aryl and divalent lower alkyl; R<sup>15</sup> is selected from lower alkyl and aryl; and R<sup>16</sup> is divalent lower alkyl.

Q

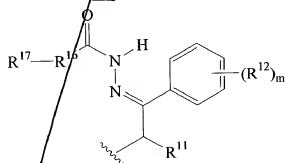
- 
- A chemical structure showing a benzene ring with a wavy line extending from one of its carbons, indicating a point of attachment. The wavy line is connected to a methylene group (-CH<sub>2</sub>-), which is further connected to another methylene group (-CH<sub>2</sub>-). The entire structure is labeled with R<sup>13</sup> at the end of the wavy line.

and  $R^{13}$  is

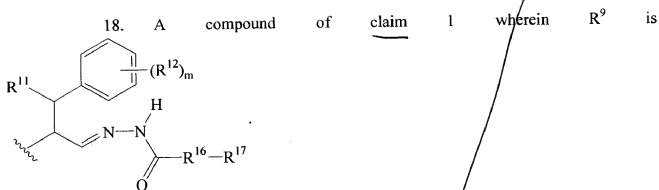


- lower alkyl.

16. A compound of claim 1 wherein R<sup>9</sup> is

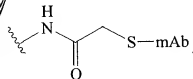


17. A compound of claim 16 wherein R<sup>16</sup> is selected from divalent lower alkyl

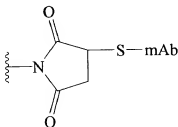


19. A compound of claim 18 wherein  $R^{16}$  is selected from divalent lower alkyl and divalent aryl.

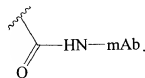
20. A compound of claim 1 wherein  $R^{17}$  is



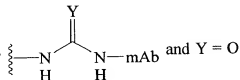
21. A compound of claim 1 wherein  $R^{17}$  is



22. A compound of claim 1 wherein  $R^{17}$  is

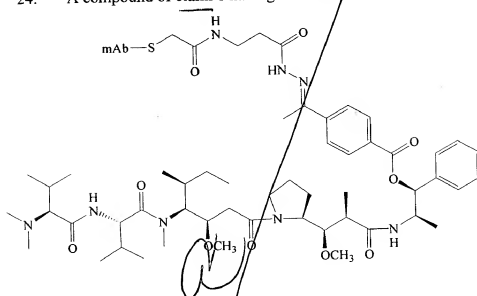


23. A compound of claim 1 wherein  $R^{17}$  is

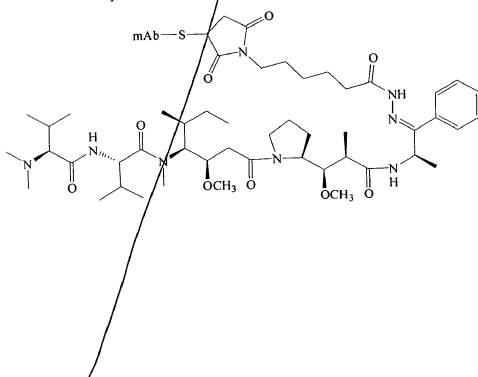


or S.

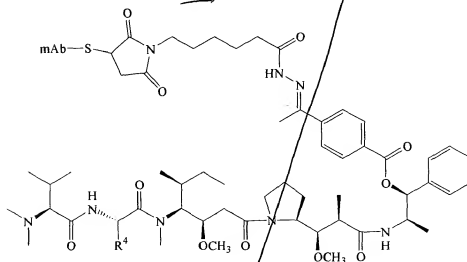
24. A compound of claim 1 having the structure



25. A compound of claim 1 having the structure

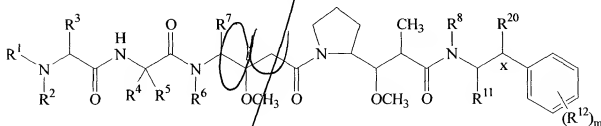


26. A compound of claim 1 having the structure



wherein  $R^4$  is selected from *iso*-propyl and *sec*-butyl.

27. A compound of the formula



wherein, independently at each location:

$R^2$  is selected from hydrogen and lower alkyl;

$R^3$  is lower alkyl;

$R^4$  is selected from lower alkyl, aryl, and  $-CH_2-C_{5-7}$ carbocycle when  $R^5$  is selected from H and methyl, or  $R^4$  and  $R^5$  together form a carbocycle of the partial formula  $-(CR^aR^b)_n$ —wherein  $R^a$  and  $R^b$  are independently selected from hydrogen and lower alkyl and  $n$  is selected from 2, 3, 4, 5 and 6;

$R^6$  is selected from hydrogen and lower alkyl;

$R^7$  is *sec*-butyl or *iso*-butyl;

$R^8$  is selected from hydrogen and lower alkyl;

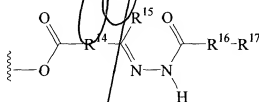


Section 9

$R^{20}$  is a reactive linker group having a reactive site that allows  $R^{20}$  to be reacted with a targeting moiety, where  $R^{20}$  can be bonded to the carbon labeled "x" by either a single or double bond.

28. A compound of claim 27 wherein the reactive site is selected from *N*-hydroxysuccinimide ester, *p*-nitrophenyl ester, pentafluorophenyl ester, isothiocyanate, isocyanate, anhydride, acid chloride, and sulfonyl chloride.

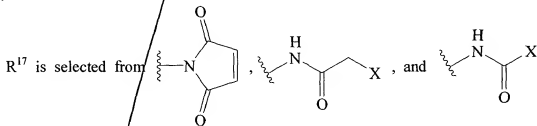
formula



R<sup>14</sup> is selected from a direct bond, divalent lower alkyl and divalent aryl;

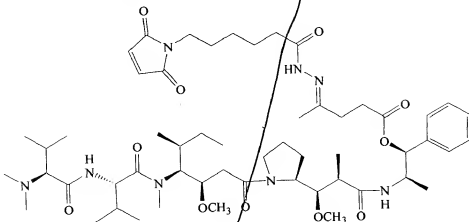
R<sup>16</sup> is selected from divalent lower alkyl, divalent aryl, and  $-(\text{CH}_2\text{OCH}_2)_n\text{CH}_2-$

where p is 1-5; and

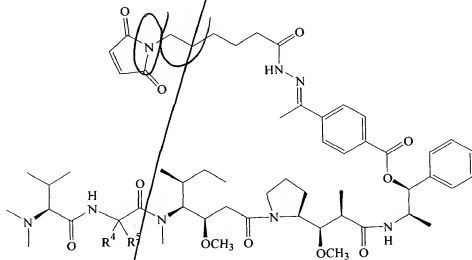


wherein X is a leaving group.

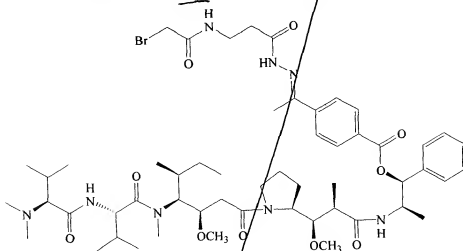
30. A compound of claim 29 having the formula



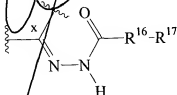
31. A compound of claim 29 having the formula



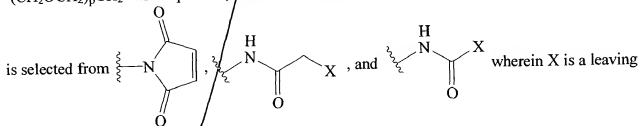
wherein  $R^4$  is selected from *iso*-propyl and *sec*-butyl, and  $R^5$  is hydrogen.

[illegible]

formula:

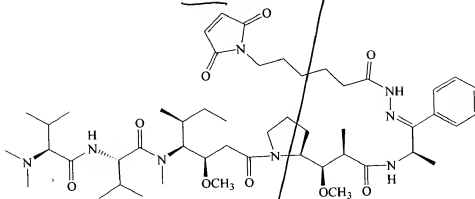


wherein R<sup>16</sup> is selected from divalent lower alkyl, divalent aryl, and -(CH<sub>2</sub>OCH<sub>2</sub>)<sub>p</sub>CH<sub>2</sub>- where p is 1-5, and x identifies the carbon also marked x in claim 27; and R<sup>17</sup>

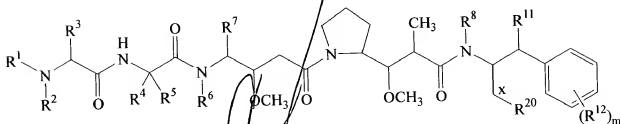


group.

34. A compound of claim 32 having the formula



35. A compound of the formula



wherein, independently at each location:

R<sup>1</sup> is selected from hydrogen and lower alkyl;

R<sup>2</sup> is selected from hydrogen and lower alkyl;

R<sup>3</sup> is lower alkyl;

R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>5-7</sub>-carbocycle when R<sup>5</sup> is selected from H and methyl, or R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6;

R<sup>6</sup> is selected from hydrogen and lower alkyl;

R<sup>7</sup> is *sec*-butyl or *iso*-butyl;

R<sup>8</sup> is selected from hydrogen and lower alkyl;

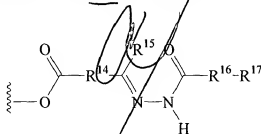
R<sup>11</sup> is selected from hydrogen and lower alkyl;

$R^{12}$  is selected from lower alkyl, halogen, and methoxy, and  $m$  is 0-5 where  $R^{12}$  is independently selected at each occurrence; and

$R^{20}$  is a reactive linker group having a reactive site that allows  $R^{20}$  to be reacted with a targeting moiety, where  $R^{20}$  can be bonded to the carbon labeled "x" by either a single or double bond.

36. A compound of claim 35 wherein the reactive site is selected from *N*-hydroxysuccinimide ester, *p*-nitrophenyl ester, pentafluorophenyl ester, isothiocyanate, isocyanate, anhydride, acid chloride, and sulfonyl chloride.

37. A compound of claim 35 wherein  $R^{20}$  comprises a hydrazone of the formula

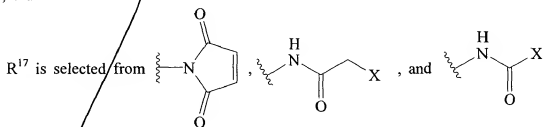


wherein:

$R^{14}$  is selected from a direct bond, divalent lower alkyl and divalent aryl;

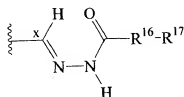
$R^{15}$  is selected from hydrogen, lower alkyl and aryl;

$R^{16}$  is selected from divalent lower alkyl, divalent aryl, and  $-(CH_2OCH_2)_pCH_2-$  where  $p$  is 1-5; and

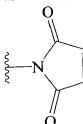
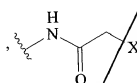
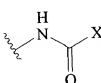


wherein  $X$  is a leaving group.

38. A compound of claim 35 wherein  $R^{20}$  comprises a hydrazone of the formula:

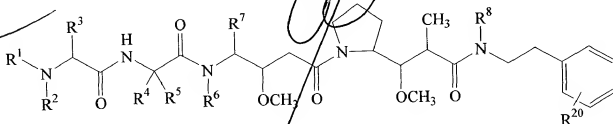


wherein  $R^{16}$  is selected from divalent lower alkyl, divalent aryl, and  $(CH_2OCH_2)_pCH_2-$  where  $p$

is 1-5; and  $R^{17}$  is selected from , , and  where

X is a leaving group.

39. A compound of the formula



wherein, independently at each location:

$R^1$  is selected from hydrogen and lower alkyl;

$R^2$  is selected from hydrogen and lower alkyl;

$R^3$  is lower alkyl;

$R^4$  is selected from lower alkyl, aryl, and  $-CH_2-C_{5-7}$ carbocycle when  $R^5$  is selected from H and methyl, or  $R^4$  and  $R^5$  together form a carbocycle of the partial formula  $-(CR^aR^b)_n-$  wherein  $R^a$  and  $R^b$  are independently selected from hydrogen and lower alkyl and  $n$  is selected from 2, 3, 4, 5 and 6;

$R^6$  is selected from hydrogen and lower alkyl;

$R^7$  is *sec*-butyl or *iso*-butyl;

$R^8$  is selected from hydrogen and lower alkyl; and

$R^{20}$  is a reactive linker group comprising a reactive site that allows  $R^{20}$  to be reacted with a targeting moiety.

40. A compound of claim 39 wherein the reactive site is selected from *N*-hydroxysuccinimide ester, *p*-nitrophenyl ester, pentafluorophenyl ester, isothiocyanate, isocyanate, anhydride, acid chloride, and sulfonyl chloride.

41. A compound of claim 39 wherein  $R^{20}$  comprises a hydrazone of the formula



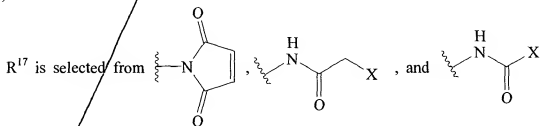
wherein:

$R^{14}$  is selected from a direct bond, divalent lower alkyl and divalent aryl;

$R^{15}$  is selected from hydrogen, lower alkyl and aryl;

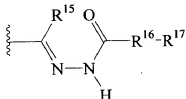
$R^{16}$  is selected from divalent lower alkyl, divalent aryl, and  $-(CH_2OCH_2)_pCH_2-$

where *p* is 1-5; and

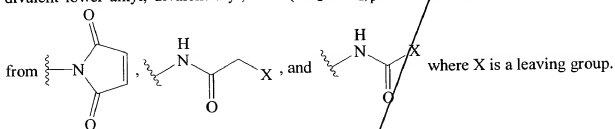


where *X* is a leaving group.

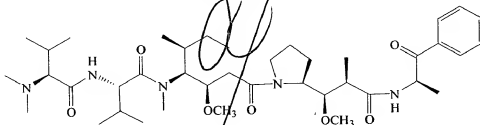
42. A compound of claim 39 wherein R<sup>20</sup> comprises a hydrazone of the formula:



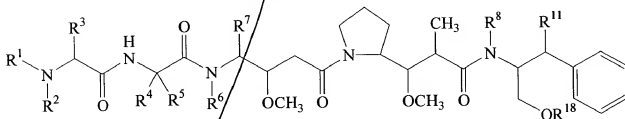
wherein, R<sup>15</sup> is selected from hydrogen, and lower alkyl, R<sup>16</sup> is selected from divalent lower alkyl, divalent aryl, and -(CH<sub>2</sub>OCH<sub>2</sub>)<sub>p</sub>CH<sub>2</sub>- where p is 1-5 and R<sup>17</sup> is selected



43. A compound of the formula



44. A compound of the formula



wherein, independently at each location:

R<sup>1</sup> is selected from hydrogen and lower alkyl;

R<sup>2</sup> is selected from hydrogen and lower alkyl;



R<sup>3</sup> is lower alkyl;

R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>5-7</sub>carbocycle when R<sup>5</sup> is selected from H and methyl, or R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6;

R<sup>6</sup> is selected from hydrogen and lower alkyl;

R<sup>7</sup> is *sec*-butyl or *iso*-butyl;

R<sup>8</sup> is selected from hydrogen and lower alkyl;

R<sup>11</sup> is selected from hydrogen and lower alkyl; and

R<sup>18</sup> is selected from hydrogen, a hydroxyl/protecting group, and a direct bond

where OR<sup>18</sup> represents =O.

45. A compound of claim 44 wherein R<sup>1</sup> is hydrogen.

46. A compound of claim 44 wherein R<sup>1</sup> and R<sup>2</sup> are methyl.

47. A compound of claim 44 wherein R<sup>3</sup> is isopropyl.

48. A compound of claim 44 wherein R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>5-7</sub>carbocycle and R<sup>5</sup> is selected from H and methyl.

49. A compound of claim 44 wherein R<sup>4</sup> is selected from lower alkyl, and R<sup>5</sup> is selected from H and methyl.

50. A compound of claim 44 wherein R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6.

51. A compound of claim 44 wherein R<sup>6</sup> is lower alkyl.

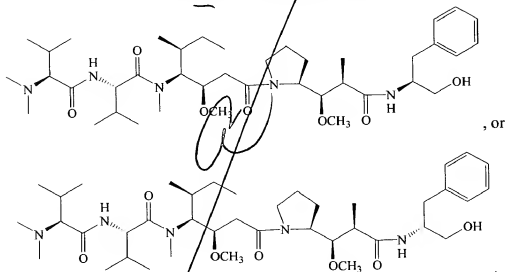
52. A compound of claim 44 wherein  $R^8$  is hydrogen.

53. A compound of claim 44 wherein  $R^{11}$  is hydrogen.

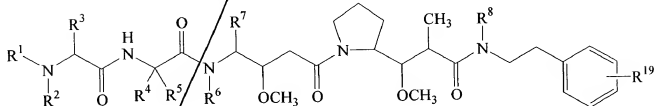
54. A compound of claim 44 wherein  $-OR^{18}$  is  $=O$ .

55. A compound of claim 44 wherein  $R^{18}$  is hydrogen.

56. A compound of claim 44 having the structure



57. A compound of the formula



wherein, independently at each location:

$R^1$  is selected from hydrogen and lower alkyl;

$R^2$  is selected from hydrogen and lower alkyl;

R<sup>3</sup> is lower alkyl;

R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>5-7</sub>carbocycle when R<sup>5</sup> is selected from H and methyl, or R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6;

R<sup>6</sup> is selected from hydrogen and lower alkyl;

R<sup>7</sup> is *sec*-butyl or *iso*-butyl;

R<sup>8</sup> is selected from hydrogen and lower alkyl; and

R<sup>19</sup> is selected from hydroxy- and oxo-substituted lower alkyl.

58. A compound of claim 57 wherein R<sup>1</sup> is hydrogen.

59. A compound of claim 57 wherein R<sup>1</sup> and R<sup>2</sup> are methyl.

60. A compound of claim 57 wherein R<sup>3</sup> is *iso*-propyl.

61. A compound of claim 57 wherein R<sup>4</sup> is selected from lower alkyl, aryl, and -CH<sub>2</sub>-C<sub>5-7</sub>carbocycle and R<sup>5</sup> is selected from H and methyl.

62. A compound of claim 57 wherein R<sup>4</sup> is selected from lower alkyl, and R<sup>5</sup> is selected from H and methyl.

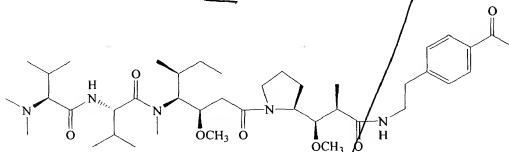
63. A compound of claim 57 wherein R<sup>4</sup> and R<sup>5</sup> together form a carbocycle of the partial formula -(CR<sup>a</sup>R<sup>b</sup>)<sub>n</sub>- wherein R<sup>a</sup> and R<sup>b</sup> are independently selected from hydrogen and lower alkyl and n is selected from 2, 3, 4, 5 and 6.

64. A compound of claim 57 wherein R<sup>6</sup> is lower alkyl.

65. A compound of claim 57 wherein R<sup>8</sup> is hydrogen.

66. A compound of claim 57 wherein R<sup>19</sup> is oxo-substituted lower alkyl.

67. A compound of claim 57 having the structure



68. A composition comprising a compound of any one of claims 1-26 and a pharmaceutically acceptable carrier, diluent or excipient.

69. A composition comprising a compound of any one of claims 40-64 and a pharmaceutically acceptable carrier, diluent or excipient.

70. A method for killing a cell, the method comprising contacting the cell with a lethal amount of the compound of claim 1-26.

71. A method for killing a cell, the method comprising administering to the cell a lethal amount of the compound of any one of claims 43-67.

72. A method of killing a cell comprising

a. delivering a compound of any one of claims 1-26 to a cell, where the compound enters the cell;

b. cleaving mAb from the remainder of the compound; and

c. killing the cell with the remainder of the compound.

73. A method of killing a cell comprising

